

## Extreme Environment Ceramic-To-Metal Seal, Phase I

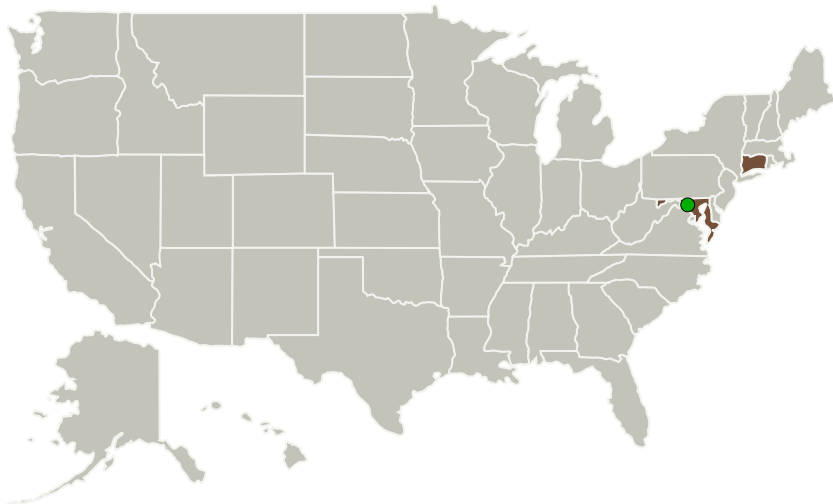
Completed Technology Project (2014 - 2014)



## Project Introduction

The proposed Phase 1 program will demonstrate the feasibility of large ceramic to metal joints/seals that can tolerate extreme environments. The immediate application of the work is bonded sapphire viewports for a Venus probe. TvU's commercial viewport products have demonstrated that the pressure and temperature constraints of the surface of Venus will be met, while the use of materials appropriate to the atmospheric conditions will satisfy the overall physical constraints. The ceramic bonding and viewport systems will be shown to be adaptable to overall NASA use constraints. Task work will detail the design of the ceramic to metal joining process as well as a generic viewport design. A variety of alumina and sapphire fixtures will be fabricated and tested under wide thermal and mechanical conditions. A specific prototype viewport will be designed, fabricated and tested at Venus lander atmospheric conditions in Phase 1. Phase 1 work will lay out the foundation for a variety of prototype systems developed and tested in the Phase 2 program.

## Primary U.S. Work Locations and Key Partners



Extreme Environment Ceramic-to-Metal Seal Project Image

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Thoughtventions Unlimited	Lead Organization	Industry	Glastonbury, Connecticut
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Connecticut	Maryland

## Project Transitions

**June 2014:** Project Start**December 2014:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/137530>)

## Images

**Project Image**

Extreme Environment Ceramic-to-Metal Seal Project Image  
(<https://techport.nasa.gov/image/128721>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Thoughtventions Unlimited

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

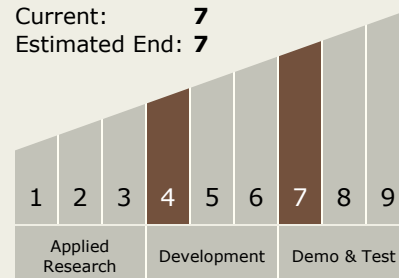
Carlos Torrez

**Principal Investigator:**

Stephen C Bates

## Technology Maturity (TRL)

Start: 4  
Current: 7  
Estimated End: 7



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### Technology Areas

#### Primary:

- TX04 Robotic Systems
  - └ TX04.2 Mobility
    - └ TX04.2.4 Surface Mobility

### Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System